March 15, 1927. 1,620,863

D. BELCHER

FEEDING ATTACHMENT FOR PRINTING PRESSES

Filed April 16, 1924 3 Sheets-Sheet 1

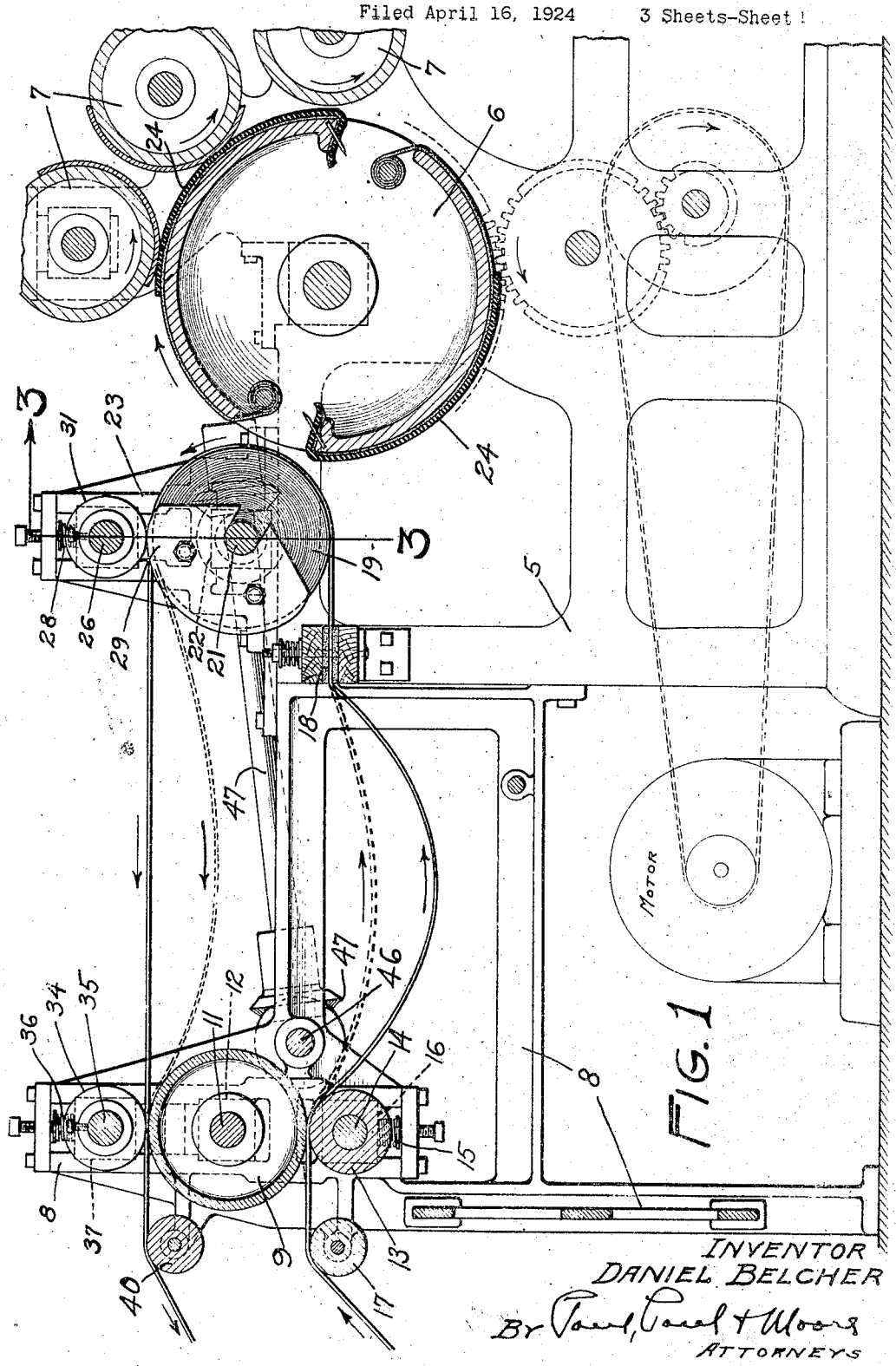



FIG. 1

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FEEDING ATTACHMENT FOR PRINTING PRESSES

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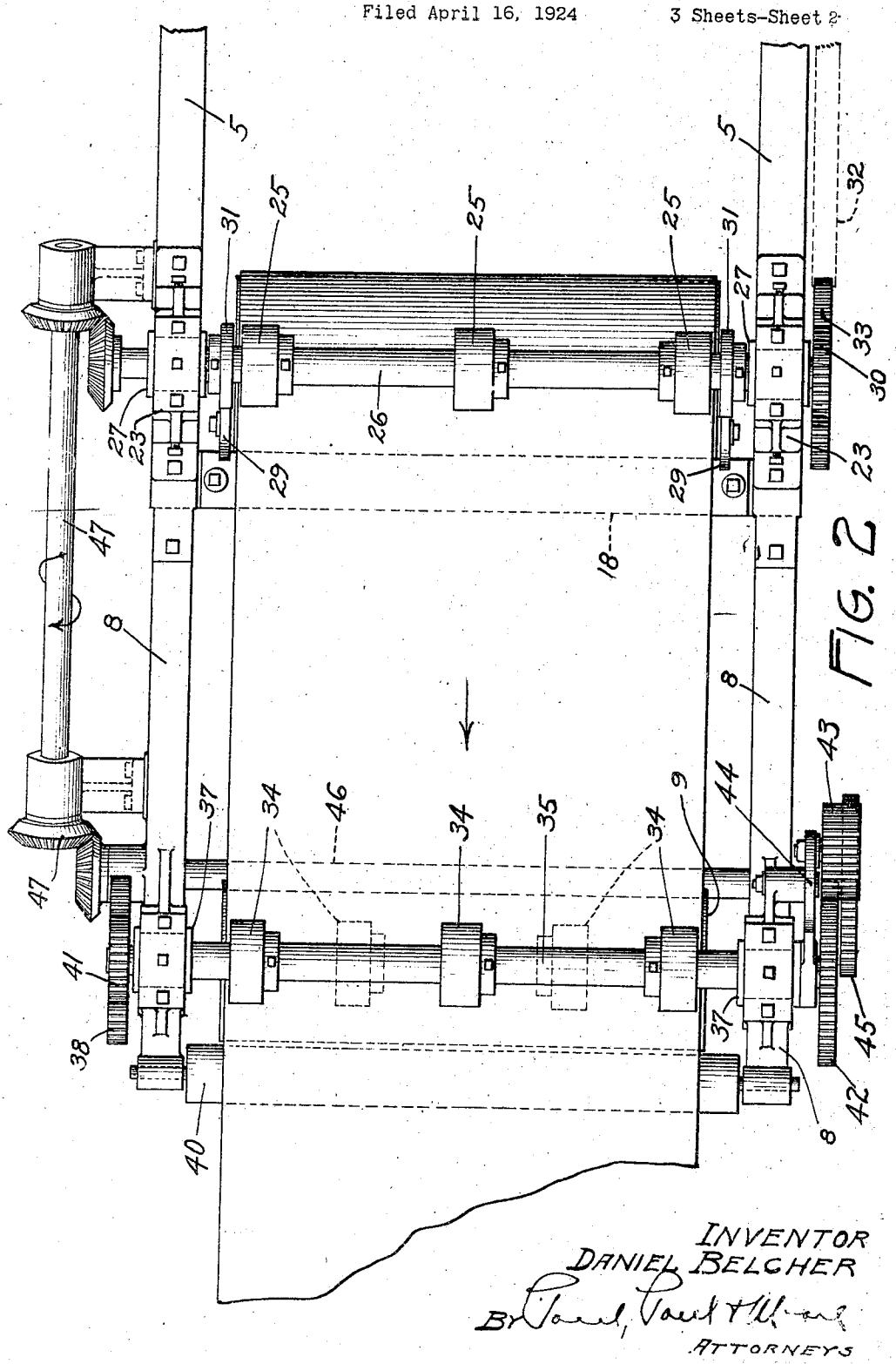



FIG. 2

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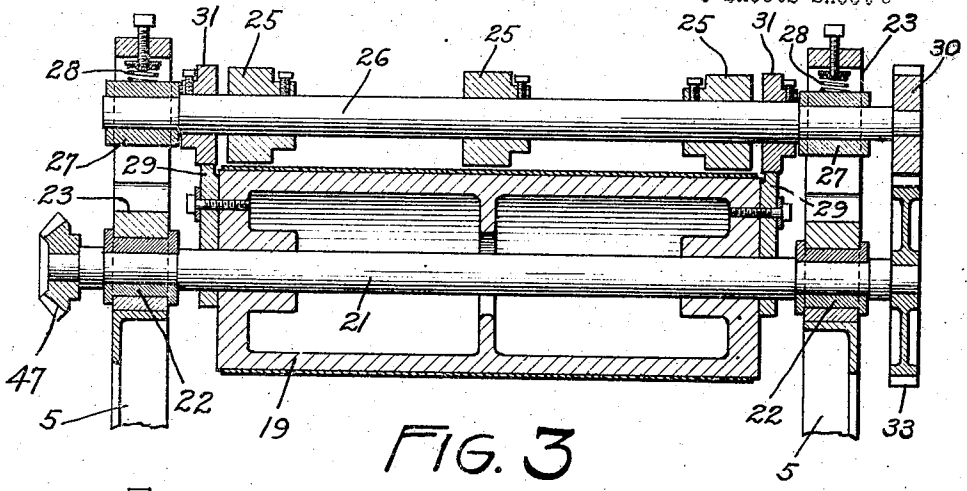



FIG. 3

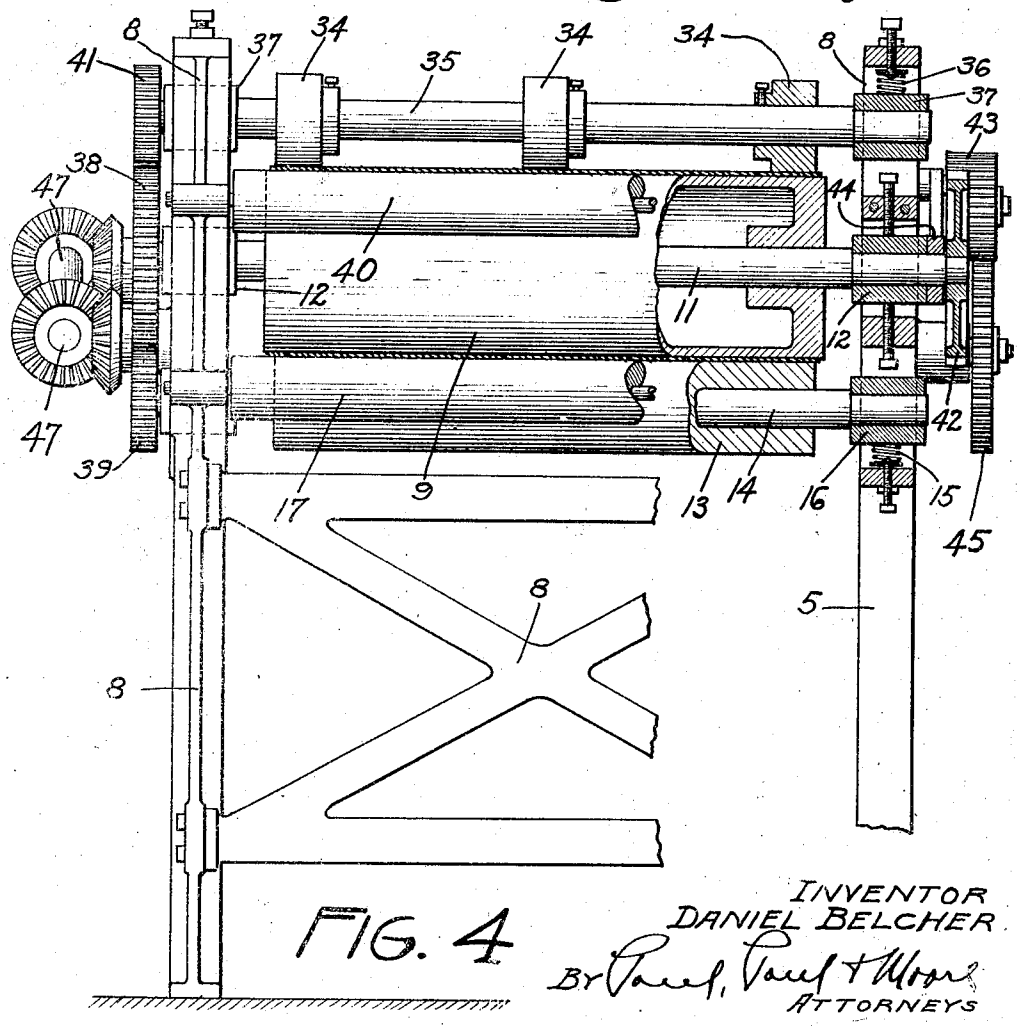



FIG. 4

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Patented Mar. 15, 1927. 1,620,863

# UNITED STATES PATENT OFFICE.

DANIEL BELCHER, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR TO BEMIS BRO. BAG CO., OF MINNEAPOLIS, MINNESOTA, A CORPORATION OF MISSOURI.

## FEEDING ATTACHMENT FOR PRINTING PRESSES.

Application filed April 16, 1924. Serial No. 706,917.

My invention is designed as an adjunct or attachment to any form of printing press by means of which the material to be printed on is taken directly from a roll or coil and delivered to the printing surface in a continuous sheet and manipulated so that the printing matter can be applied to the sheet in any position and with any desired distance between impressions. The printed material is then removed from the printing surface, still in a continuous sheet, and delivered and re-rolled or converted into any form or shape as may be desired for future manufacture or use.

In the manufacture of paper or cloth sacks for various purposes, it is frequently desirable to increase or decrease the distance between the impressions made on the material accordingly as the size or length of the sack is varied. Newspaper and similar presses make impressions on a moving web of paper at regular intervals but no provision is made for varying the distance between the impressions and in newspaper work usually there is no necessity for such provision. In bag making, however, such necessity does arise and the primary object of my invention is to provide means which will enable the operator of the press to make suitable adjustments and vary the distance between the impressions on the sheet or cloth and thus adapt the same machine for making sacks of different sizes.

The invention consists generally in various constructions and combinations all as hereinafter described and particularly pointed out in the claims.

In the accompanying drawings forming part of this specification,

Figure 1 is a view in vertical section of the feeding end of a printing press showing my improved feeding attachment applied thereto;

Figure 2 is a plan view of the feeding attachment;

Figure 3 is a transverse sectional view on the line 3—3 of Figure 1, showing the gripper rolls out of contact with the web of material;

Figure 4 is a view in end elevation of Figure 1, partially in section.

In the accompanying drawings there is illustrated one end of a printing press comprising the usual frame 5 upon which the usual impression cylinder 6 and complementary printing rolls 7 are mounted.

The novel feeding attachment here shown preferably has one end supported upon the frame 5 of the printing press while the other end thereof is preferably supported upon an auxiliary frame 8 having one end suitably secured to the press frame 5, as shown in Figure 1. The means provided for feeding the sheet or web of material to the printing means consists of a feed cylinder 9 mounted upon a shaft 11 which is rotatably mounted in suitable bearings 12 provided adjacent the outer end of the frame 8. A complementary feed roll 13 is mounted upon a shaft 14 beneath the feed cylinder 9. This roll is adapted normally to be yieldingly held against the periphery of the feed cylinder 9 by means of compression springs 15 bearing against the bearings 16 thereof, which are adapted to vertical movement in the frame 8. An idler roll 17 is provided adjacent the feed cylinder 9 to guide the web of material between the feed cylinder and roll substantially on a horizontal line.

After the material is fed between the feed cylinder 9 and roll 13, it is passed through a suitable friction or tension means 18 secured to the frame 5, and around an impression or printing cylinder 19 for subsequent printing. The cylinder 19 is mounted upon a shaft 21, which is borne by suitable bearings 22 preferably adjustably mounted in brackets 23 secured to the main frame 5, in order that the impression cylinder may be axially aligned with the printing cylinder 6, and also in order that the proper contact may be had between the material and the printing surface or blanket 24 of the cylinder 6 to obtain a good impression. A plurality of feed or gripper wheels 25 are mounted upon a shaft 26 above the impression cylinder 19, and this shaft is mounted in bearings 27 which are vertically movable in the brackets 23. Suitable compression springs 28 are provided above the bearings 27 which normally tend to force the shaft 26, and therefore the feed wheels 25, downwardly against the peripheral surface of the impression cylinder 19.

Means are provided for checking, for a

predetermined period, the feed of the material between the impression cylinder 19 and the transfer or printing cylinder 6 in order to vary the distance between the impressions to be made thereon. Such means preferably consists in the provision of a suitable cam 29 secured to each end of the cylinder 19 as shown in Figures 1 and 3. These cams coact with a pair of cam wheels 31 secured to the shaft 26, to lift or move the feed wheels 25 out of contact with the material and thereby temporarily interrupt the feed of the material around the cylinder 19, such period of interruption being governed by the length of the cam faces.

The length of the impression is governed by that portion of a revolution of the impression cylinder 19, in which the cam 29 is out of engagement with the cam wheels 31 and the feed wheels 25 are yieldingly held in contact with the web of material thereby causing it to be fed synchronously with the rotation of the impression cylinder. The lengths of the transfer blankets 24 on the transfer cylinder 6 are also governed by the length of the impression and must, therefore, coincide substantially with the circumferential length of that portion of the peripheral surface of the cylinder 19 in which the feed wheels 25 are in feeding contact therewith. Therefore, it will be readily understood that to vary the length of the impression it is necessary, in the majority of cases, to change the size of the cams and also the length of the transfer blankets 24. The cams are, therefore, demountably secured to the cylinder 19 so that they may readily be demounted and other cams substituted as required. In Figure 1 the transfer cylinder is shown as having two transfer blankets mounted thereon in which case two impressions are made for each revolution thereof. When two impressions are thus made for each revolution of the transfer cylinder 6 the circumference thereof is preferably equal to two times the circumference of the impression cylinder 19 so that the latter will make two revolutions to each revolution of the former. Therefore, in order that the impression cylinder 19 may be accurately and positively timed with respect to the rotation of the transfer cylinder 6, it is preferably driven directly from the main cylinder gear 32 by means of a gear 33 terminally secured to the shaft 21 thereof. The main cylinder gear 32 is of ordinary construction and well known in the art, and is therefore represented by dotted lines only in Figures 1 and 2. The feed wheel shaft 26 is positively driven by means of a pinion 30 mounted thereon and adapted to mesh with the gear 33 on the shaft 21. The pitch diameter of the gear 33 and pinion 30 are preferably equal to the diameters of the impression cylinder 19 and feed wheels 25, respectively, so that their peripheral speeds will be identical.

After the web of material has passed around the impression cylinder 19 and the impression made thereon, as above described, it is drawn outwardly therefrom and over the feed cylinder 9 as particularly shown in Figure 1. A series of draw rolls or wheels 34 are mounted upon a shaft 35 above the feed cylinder 9 and function to cooperate with the cylinder to discharge the printed material from the machine. These draw rolls are yieldingly held in constant contact with the material by means of springs 36 which normally tend to downwardly move the bearings 37 in which the shaft 35 is mounted. A gear 38 is provided on the shaft 11 adjacent one end of the feed cylinder 9 and meshes with a pinion 39 on the feed roll shaft 14, and with a similar pinion 41 on the draw roll shaft 35 for the purpose of transmitting power thereto. These gears are also of such diameter that the peripheral speeds of the feed cylinder, feed roll and draw rolls will be identical in order that there will be no slippage on the material as it is being fed to and from the printing means. An idler roll 40 may also be provided adjacent the feed cylinder 9 to horizontally guide the webbing from the cylinder.

In order that the distance between impression on the webbing may be increased or decreased, the feed of the material to the impression cylinder 19 must be variable and constant. The feed cylinder 9 is therefore preferably operated by means of a set of speed change gears mounted adjacent one end thereof. As shown in Figures 2 and 4, a gear 42 is terminally mounted on the shaft 11 adapted to mesh with a relatively wider faced intermediate pinion 43 carried by an adjustably mounted change gear arm 44, pivotally mounted on the shaft 11 between the bearing 12 and gear 42. A change gear 45 is demountably mounted upon one end of a countershaft 46 which is rotatably mounted in suitable bearings provided in the auxiliary frame 8. A bevel gear drive 47 is provided at the opposite side of the machine to constantly transmit power to the feed cylinder from the impression cylinder shaft 21, as clearly shown in Figure 2. Thus, it will readily be seen and understood that to increase or decrease the feed of the material it is only necessary to remove the change gear 45 and substitute therefor a larger or smaller gear commensurate with the speed of the feed required. The feeding of the material into the machine and drawing it therefrom is therefore constant and is always at a lower speed than the speed of the material when being printed, thereby forming loose folds in the webbing as shown in Figure 1.

In order to vary the distance between impressions it is necessary that the web of material be permitted to slip or slide a predetermined amount over the surface of the impression cylinder 19 for each impression made, such slippage taking place during the period that the feed wheels 25 are out of contact with the material.

In starting the material in this novel feeding attachment it is first inserted between the feed cylinder 9 and feed roll 13 after which it is passed through the tension bar 18 and around the impression cylinder 19 and back between the feed cylinder and draw rolls 34 as shown in Figure 1. Before starting the machine, however, a sufficient amount of material will be fed into the machine to form a loop or fold as indicated by the dotted line position of the lower section of the webbing in Figure 1. This lower section of the webbing is constantly slack as indicated. In Figure 1 the cams 29 are shown in a position about to disengage the cam wheels 31. As soon as the cam wheels 31 are out of engagement with the cams the feed rolls 25 will contact with the material and cause it to be fed around the impression cylinder, and substantially at the same instant the transfer blanket 24 will be brought into contact with the material and the impression made thereon. Owing to the relatively higher peripheral speed of the impression cylinder 19 with respect to the peripheral speed of the feed cylinder 9, a portion of the slack in the fold of the lower section of the webbing will be taken up during the printing operation, and simultaneously a fold will be formed in the upper section of the webbing as indicated by the dotted line position thereof, as a result of the lower peripheral speed of the feed cylinder 9. As soon as the printing operation has been performed, and the impression made the cams will engage the cam wheels 31 and move the feed wheels out of engagement with the material, thereby causing the feeding of the material around the impression cylinder to be temporarily interrupted, the tension bar 18 holding the webbing against further movement and thereby causing the impression cylinder to rotate idly within the loops of the webbing. During this period of the cycle of operation the fold in the upper section of the web of material will be gradually taken up by the draw rolls 34 and feed cylinder 9, due to the temporary interruption of the material around the cylinder 19, and when the upper section becomes taut the material will be drawn through the tension bar 18 and around the impression cylinder 19 at a relatively slower speed than the peripheral speed of the cylinder, thereby causing a slippage between the material and cylinder. As soon as the cams again move out of engagement with the cam wheels, the feed rolls 25 will move into contact with the material and feed it around the impression cylinder for the next impression.

Thus, it will readily be seen that to vary the length of impressions it is only necessary to change the size of the cams and the length of the transfer blankets, and to increase or decrease the feed of the material between the impression cylinder 19 and the transfer cylinder 6 at the time when the two cylinders are out of printing contact with each other and the feed wheels 25 are out of feeding contact with the impression cylinder 19. At such period the web of material may be fed between the two cylinders at a relatively higher speed than the peripheral speed of the impression cylinder which will cause the material to slip over the surface of the cylinder, as hereinbefore described. The relatively faster feeding of the material between the cylinders, as above mentioned, is accomplished by varying the speed of the feed cylinder 9, by changing the gear 45 on the end of the counter-shaft 46.

In the drawings, I have shown the attachment used in conjunction with a printing press of the rotary direct printing type, which, by the use of the cylinder 19 and by using the printing cylinder 6 as a transfer cylinder, has been converted into an offset type of printing press. It is to be understood, however, that the attachment may be used equally as well in conjunction with other types of printing presses by slightly modifying the construction here shown.

I claim as my invention:

1. The combination with means for printing at intervals upon a continuous web, a feed cylinder and rolls cooperable therewith for continuously feeding respective runs of a web to and from the printing means, movably journaled synchronously driven gripper-rolls, cooperable with the printing means to intermittently feed the web at a higher speed than said continuous web feeding means, during a printing operation, and means for checking the travel of the incoming run of the web.

2. The combination with means for printing at intervals upon a web, a feed cylinder having rolls cooperable therewith for feeding respective runs of the web toward and from the printing means, movably journaled synchronously driven gripper-rolls cooperable with the printing means to feed the web, and cams arranged to separate said gripper-rolls during a non-printing period, and means for checking the travel of the incoming run of the web.

3. In combination with a press including an impression cylinder, and automatically adjustable synchronously driven gripper wheels cooperable with the cylinder for feed-

ing the web, a feed cylinder having rolls cooperable therewith for feeding opposite runs of a web respectively toward and away from the impression cylinder, and gripper-roll raising means, operable by the impression cylinder for inactivating the rolls during a non-printing period, and a guide frictionally engaging the run of the web traveling toward the impression cylinder.

4. A device of the class described, comprising an impression cylinder, synchronously driven gripper-rolls cooperable therewith, cam means on the impression cylinder for raising gripper rolls during a non-printing period, a feed cylinder, and rolls engaging therewith for feeding the runs of the web in opposite directions toward and away from the impression cylinder, and means for frictionally retarding that run of the web traveling toward the impression cylinder, and disposed intermediately of said impression and feed cylinders.

5. The combination with a cylinder having a surface to receive the impression of a printing platen to transfer such impression to a flexible sheet, of means for feeding the sheet synchronously with the movement of said cylinder, said feeding means comprising a roll and feed wheels cooperating therewith, means for separating said wheels from said roll to temporarily interrupt the feed of said sheet, and a feed cylinder and rolls cooperable therewith for feeding the sheet toward said roll and drawing it therefrom and operating at a slower speed, and means frictionally engaging the sheet between the feed and impression cylinders whereby the sheet will hang in loose folds on the receiving and discharging side of said feed roll and allow said remote feeding means to operate continuously and said sheet be temporarily stationary on said feed roll.

6. The combination with means for printing upon a continuous sheet and spacing the impressions thereon including an impression cylinder of a feed cylinder and rolls cooperable therewith on the same side thereof for feeding the sheet toward and from said printing means continuously, means cooperable with said impression cylinder for feeding and supporting the sheet during the printing operation and operating at a higher speed than said feed cylinder, a friction take-up through which said sheet passes on the receiving side of said adjacent feeding means, said adjacent means having a part adapted for adjustment to temporarily release said sheet and interrupt the feed thereof, said sheet due to said difference in speed, forming a loose fold adjacent the receiving side of said remote feeding means and sufficient slack being provided in said sheet on the discharge side of said remote feeding means to allow said remote feed to operate continuously and the travel of the sheet through the adjacent feeding means to be retarded.

7. In a machine of the class described, a transfer cylinder, an impression cylinder cooperating therewith to make impressions upon a web of material at predetermined intervals, means for operating said impression cylinder continuously, a feed cylinder, a feed roll cooperating with said feed cylinder to feed the web of material to said impression cylinder, a fold or loop of the material being formed initially between said feed roll and impression cylinder, a second roll cooperating with said feed cylinder on the discharge side of said impression cylinder to receive the web therefrom after the printing operation, said feed cylinder operating at a lower peripheral speed than said impression cylinder whereby a fold or loop will be formed in the web of material on the discharge side of said impression cylinders, a tension device on the receiving side of said impression cylinder through which the web of material passes, said tension device permitting the web to be drawn therethrough to take up the loop on the receiving side of said impression cylinder when the continued operation of said feed cylinder has taken up the loop on the discharge side of said impression cylinder after the movement of said impression cylinder has been interrupted.

8. In a machine of the class described, a transfer cylinder having blankets thereon, an impression cylinder cooperating with said transfer cylinder to make impressions upon a web of material fed between them, movably journaled driven, gripper rolls for engaging the web on said impression cylinder for feeding it thereon synchronously with the movement of said transfer cylinder, cams rotatable with said impression cylinder and arranged to raise the gripper rolls during non-printing period, a feed cylinder having means cooperating therewith for feeding the web of material to said impression cylinder before the printing operation and withdrawing the web from said impression cylinder after the printing operation, and means frictionally engaging the web before arrival at the impression cylinder.

9. The combination with a transfer cylinder, of an impression cylinder cooperating with said transfer cylinder to make impressions at intervals upon a web of material, means for positively feeding the web to said impression cylinder before the printing operation, said means also operating to positively withdraw the web from said impression cylinder after the printing operation, and means frictionally engaging the web before arrival at the impression cylinder.

In witness whereof, I have hereunto set my hand this 12th day of April, 1924.

DANIEL BELCHER.